

Agilent UltrAA Boosted Lamp Supply

User's Guide



Agilent Technologies

Notices

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Errata Statement

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

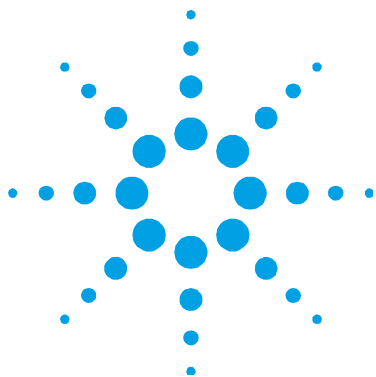
A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

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1. Safety Practices and Hazards

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General

This section should be read in conjunction with the Safety Practices and Hazards section in your spectrometer manual.

To maintain safety protection, only connect this accessory to an Agilent AA Series spectrometer with the UltrAA lamp connector provided for this purpose, refer to the 'Introduction' section.

Appropriate safety practices have been included in this operation manual and your spectrometer operation manual, to help you operate the equipment safely. Read all safety practices thoroughly before attempting to operate your system.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not position the equipment so that it is difficult to operate the disconnecting device.

Hazard Warnings

In addition to the hazard warnings specified in your spectrometer operation manual, specific hazard warnings have been included in this operation manual. These warnings state the hazard, describe how to avoid it and specify the possible consequences of not following the instructions. Read all warnings carefully and observe them at **all** times.

Electrical Hazards

The UltrAA boosted lamp supply contains electrical circuits, devices and components operating at dangerous voltages. Contact with these circuits, devices and components can cause death, serious injury or painful electric shock. Covers which are retained by screws on the lamp supply may be opened only by an Agilent field service engineer.

The lamp supply **MUST** be switched off at the power switch, and the mains cable disconnected from the mains supply **BEFORE** any attempt is made to remove or replace a lamp, or the cables connecting the supply to the spectrometer.

Use of the wrong supply voltage, connection of the accessory to an incorrectly wired supply outlet, or lack of proper electrical grounding can create a fire hazard or a shock hazard which can cause death, serious injury, or serious damage to equipment.

Always use a three-wire outlet with ground connection which is adequately rated for the load.

The installation must comply with local, state, and national safety regulations.

A blown fuse should be replaced with one of the size and rating stipulated in the text adjacent to the fuse holder. Always ensure the accessory is turned off and disconnected from the mains supply before attempting any replacement.

Notes and Tips

A Note or Tip message is used to give advice or additional information

NOTE

This is a note.

Warning and Caution Messages

A Warning message is used in the text when failure to observe instructions or precautions could result in death or injury.

WARNING



Name of Warning

Detail of hazard. Information on how to avoid the hazard.

A Caution message is used when failure to observe instructions could result in damage to equipment (Agilent supplied and/or other associated equipment).

CAUTION

This is a caution statement.

Warning Symbols

The following is a list of symbols that appear in conjunction with warnings in this manual and on the ETC. The hazard they describe is also shown.

A triangular symbol indicates a warning. The meanings of the symbols that may appear alongside warnings in the documentation or on the instrument itself are as follows:



Electrical shock



Fire hazard



Hot surface



*Heavy weight
(danger to feet)*












*Heavy weight
(danger to hands)*

The following symbol may be used on warning labels attached to the instrument. When you see this symbol, refer to the relevant operation or service manual for the correct procedure referred to by that warning label.



Information Symbols

The following symbols appear on the instrument for your information.

| | |
|---|--|
|  | Mains power on |
|  | Mains power off |
|  | Fuse |
|  | Single phase alternating current |
|  | Direct current |
|  | When attached to the rear of the instrument, indicates that the product complies with the requirements of one or more EU directives. |
|  | "On" for part of equipment. |
|  | "Off" for part of equipment. |
|  | When attached to the rear of the product, indicates that the product has been certified (evaluated) to CSA 61010.1 and UL 61010-1 |

Color Coding

The various indicator lights appearing on the instrument and any associated accessories have been color coded to represent the status of the instrument or accessory:

- A green light indicates the instrument is in normal standby condition.
- A blue light indicates that operator intervention is required.

- An orange light indicates a potential hazard.
- A red light indicates danger or an emergency.

CAUTION

An orange light indicates that the boost is active.

CE Compliance

Your UltraAA boosted lamp supply has been designed to comply with the requirements of the Electro-magnetic Compatibility (EMC) Directive and the Low Voltage (electrical safety) Directive (commonly referred to as the LVD) of the European Union. Agilent has confirmed that each product complies with the relevant Directives by testing a prototype against the prescribed EN (European Norm) standards.

Proof that a product complies with the Directives is indicated by:

- The CE Marking appearing on the rear of the product.
- The documentation package that accompanies the product, containing a copy of the Declaration of Conformity. This Declaration is the legal declaration by Agilent that the product complies with the Directives, and also shows the EN standards to which the product was tested, to demonstrate compliance.

Electromagnetic Compatibility

EN55011/CISPR11

Group 1 ISM equipment: group 1 contains all ISM equipment in which there is intentionally generated and/or used conductively coupled radio- frequency energy which is necessary for the internal functioning of the equipment itself.

Class A equipment is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

This device complies with the requirements of CISPR11, Group 1, Class A as radiation professional equipment. Therefore, there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

Operation is subject to the following two conditions:

- 1 This device may not cause harmful interference.
- 2 This device must accept any interference received, including interference that may cause undesired operation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

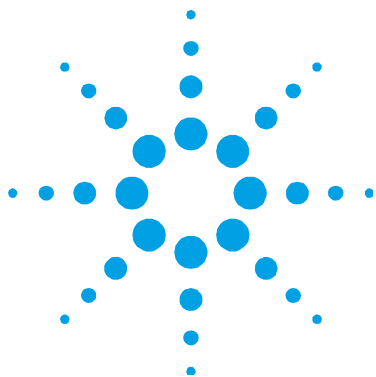
- 1 Relocate the radio or antenna.
- 2 Move the device away from the radio or television.
- 3 Plug the device into a different electrical outlet, so that the device and the radio or television are on separate electrical circuits.
- 4 Make sure that all peripheral devices are also certified.
- 5 Make sure that appropriate cables are used to connect the device to peripheral equipment.
- 6 Consult your equipment dealer, Agilent Technologies, or an experienced technician for assistance.
- 7 Changes or modifications not expressly approved by Agilent Technologies could void the user's authority to operate the equipment.

ICES/NMB-001

This ISM device complies with Canadian ICES- 001.

Cet appareil ISM est conforme à la norme NMB-001 du Canada.

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2. Introduction

The UltrAA boosted lamp supply powers UltrAA hollow cathode lamps placed in suitably wired lamp positions of compatible Agilent AA Series spectrometers.

Agilent 280Z AA spectrometers have an internal UltrAA boosted lamp supply, such that, lamp positions 1 and 3 wired to use this built-in supply.

NOTE

If you need to use more than two UltrAA lamps within a 280Z AA spectrometer, an external UltrAA boosted lamp supply can also be used to power lamp positions 5 and 7, which are wired for the use of an external supply.

Agilent 240Z AA spectrometers can be fitted with an internal UltrAA lamp power supply as an option, such that, lamp positions 1 and 2 are wired to use the built-in supply.

All other Agilent AA Series spectrometers require an external UltrAA boosted lamp supply to be connected to the instrument. This manual describes how to connect the external supply to the instrument and operation of UltrAA lamps.

NOTE

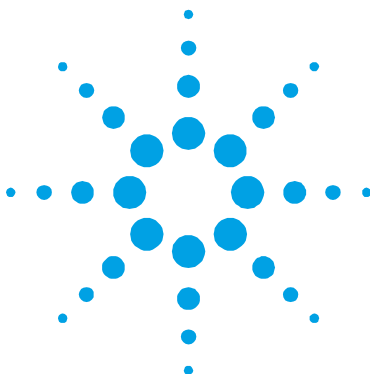
All Agilent AA Series spectrometers, and Varian labeled AA instruments with serial numbers EL96123XXX or later, will automatically operate UltrAA lamps if the required wiring is installed.

Depending on the model and options ordered, your spectrometer may be fitted with one or two connectors in the back panel of the instrument to facilitate the connection of an external UltrAA boosted lamp supply. Such spectrometers will already have the necessary looms installed inside the instrument to support UltrAA lamp operation.

If an UltrAA lamp option was not specified at the time of ordering the instrument, the required components are available in an upgrade kit. An Agilent field service engineer can install the kit on site within the lamp turret of your spectrometer.

NOTE

Operation of the UltrAA lamp as a normal hollow cathode lamp (i.e., without the boost active) is NOT recommended. This has been shown to reduce the lamp life. For maximum lamp life and the best performance from the lamp, always operate an UltrAA lamp with the boost applied.



3. Specifications

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Environmental

Your accessory is designed for indoor use only. In addition, this accessory is suitable for the following categories:

- Installation category II
- Pollution degree 2
- Equipment class I

| Condition | Altitude | Temp t (°C) | Humidity (%RH) non-condensing |
|----------------------------|---------------------------|-------------|----------------------------------|
| Non-operating (transport) | 0–2133 m (0–7000 ft) | 5–45 | 20–80 |
| Operating within | 0–853 m (0–2800 ft) | 10–35 | 8–80 |
| performance specifications | 853–2133 m (2800–7000 ft) | 10–25 | |

Power

Power for an internal UltrAA boosted lamp supply is provided by the 240Z/280Z AA spectrometer.

Electrical Supply

The power requirements associated with an external UltrAA boosted lamp supply are:

| | |
|-----------------------------|---------------------------------------|
| Voltage, AC | |
| 100 V | 100 V $\pm 10\%$ |
| 120 V | 120 V $\pm 10\%$ |
| 220 V | 230 V $+14\%/-6\%$ |
| 240 V | 230 V $+14\%/-14\%$ |
| Frequency | |
| 50–60 Hz ± 1 Hz | |
| Power Rating | |
| 150 VA maximum | |
| Electrical Output | |
| Typical | |
| Boost Run Current | 150 mA $+10\%/-5\%$ |
| Boost Run Voltage | 40 VDC ± 10 VDC |
| Boost Strike Voltage | 400 VDC ± 60 VDC |
| Filament Voltage | 1.2 VDC $\pm 10\%$ (lamp off) |
| | 12 VDC $\pm 10\%$ (prior lamp strike) |
| | 5 VDC $\pm 10\%$ (lamp run) |

External Connections

The external UltrAA boosted lamp supply also requires external connections:

| | | |
|-------------------------|--|--|
| AC Power | | IEC type, panel-mounted 6A 250VAC |
| Mains Power Cord | | |
| Australia | | 7.5 A 250 VAC CMA E711 |
| USA | | 10 A 125 VAC Electricord |
| Europe | | Europe 6 A 250 VAC Schuko CEE 10/16A |
| Lamp Supply | | Circular type on flying lead (approximately 1.3 m) |

WARNING**Electrical Shock**

To maintain safety, the external UltrAA boosted lamp supply is to be connected only to instruments installed with the UltrAA lamp option.

Weights and Dimensions

These weights and dimensions are for the external UltrAA boosted lamp supply.

Weight

| | |
|-----------------|------------------|
| Packed | 12 kg (26 lb) |
| Unpacked | 7.5 kg (16.5 lb) |

Dimensions (W × D × H)

| | |
|-----------------|---------------------------------------|
| Packed | 420 × 510 × 310 mm (17 × 20 × 12 in.) |
| Unpacked | 240 × 355 × 150 mm (10 × 14 × 6 in) |

Performance

Drift

Less than eight percent change in intensity per hour, after a 25-min warm-up.

Lamp Lifetime

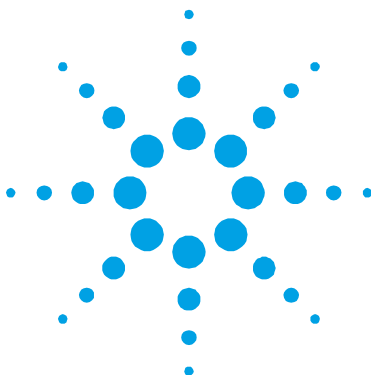
Not less than 5000 mAh at recommended operating lamp current.

NOTE

The typical lifetime of an UltrAA lamp exceeds 8000 mAh.

Specifications

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4. Getting Started

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NOTE

If you are using an internal UltrAA boosted lamp supply¹, the supply is built into the instrument and you will not need to refer to this section.

Inspection and Unpacking

WARNING



Heavy Weight

The external UltrAA boosted lamp supply weighs 7.5 kg (16.5 lb) and may cause injury or damage if dropped. Always use care when installing or lifting the external UltrAA boosted lamp supply.

External Damage Check

Before accepting delivery, check the shipping carton for any external signs of damage. If the carton shows any sign of damage, contact the carrier immediately. Any damage should be noted on the carrier's waybill.

¹Agilent 280Z AA or 240Z AA with the internal UltrAA boosted lamp supply option

Unpacking

Store the spare fuses and select the appropriate power cord from those supplied.

Remove the control module from the packaging. The UltrAA boosted lamp supply should be placed near the instrument, for example, on top of the power supply for the graphite tube atomizer (GTA).

NOTE

Please keep the packaging, as it may be necessary to repack and return the equipment in its original shipping carton during the warranty period.

Installation

Before proceeding with the installation, you must be familiar with the 'Safety Practices and Hazards' section and the correct power requirements must be available (refer to the 'Power' section, Page 15).

WARNING



Fire Hazard — Electrical Shock

Application of the wrong supply voltage, connection of the accessory to an incorrectly wired supply outlet, or lack of proper electrical grounding can create a fire or shock hazard that can cause death, serious injury, or serious damage to equipment.

Selecting the Voltage

Consult the table immediately above the selector switches or refer to and set the switches as required. For example, if the accessory is connected to 240 volts, the table tells you that the switch setting should be 'AD'. This means the left switch should be up (i.e., position 'A') and the right switch should be down (i.e., position 'D').

Table 1 Positions of selector switches for different mains power supplies

| Mains Power Supply | Switch Setting | Switch Positions | |
|--------------------|----------------|------------------|-------|
| | | Left | Right |
| 240 V $\pm 10\%$ | AD | Up | Down |
| 230 V $+14\%/-6\%$ | AD | Up | Down |
| 230 V $+6\%/-14\%$ | BD | Down | Down |
| 220 V $\pm 10\%$ | BD | Down | Down |
| 120 $\pm 10\%$ | AC | Up | Up |
| 100 $\pm 10\%$ | BC | Down | Up |

Connecting the UltrAA Boosted Lamp Supply

WARNING



Electrical Shock

The lamps operate at dangerous voltages. To avoid death or electric shock, never touch the pins in the seven-pin connectors. Always check that the mains power is switched off before connecting or disconnecting the seven-pin plug.

CAUTION

To avoid damaging the module, always switch off the lamps before connecting or disconnecting the seven-pin plug.

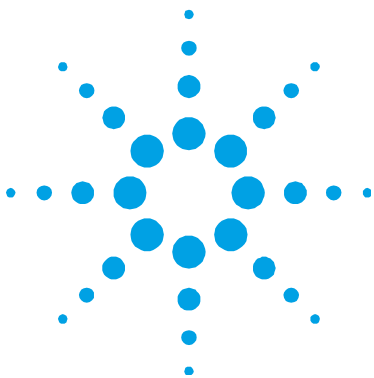
To install the UltrAA boosted lamp supply, plug the seven-pin plug from the supply into the seven-pin socket at the rear of the spectrometer. It is necessary to lift the cover on the socket at the rear of the spectrometer while pushing the connector into place.

The seven-pin plugs are keyed, and will only connect when the keyways align. Hold the plugs so the keys align, push the plugs together and then rotate the metal collar clockwise until it locks into position.

Getting Started

When the supply is connected to the instrument, connect the UltrAA boosted lamp supply to the mains power supply and turn on the mains power.

Refer to your instrument operation manual for details on how to install hollow cathode lamps.



5. Operation

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WARNING



Hot Surface
An UltrAA lamp becomes hot in use, and contact with it could cause severe burns. To avoid burns from an UltrAA lamp, turn it off and allow it to cool for a few minutes before touching it.

Turning On UltrAA Lamps

External UltrAA Boosted Lamp Supply

To use an UltrAA lamp in boosted mode, switch the external UltrAA boosted lamp supply on, then ‘strike’ the UltrAA lamp by pushing the lever of the appropriate switch to its ‘on’ position (i.e., ☉). Wait three seconds; in some cases this alone will start the boost discharge. If necessary, push the lever to ‘Strike’ and then release it; the lever will return to the ‘on’ position.

Instrument parameters are set in the normal way.

NOTE

To use an UltrAA lamp in boosted mode, you must strike the lamp manually before it is used (for example, before an unattended autorun) otherwise it will act as a normal hollow cathode lamp.

Internal UltrAA Boosted Lamp Supply

If you are using an Agilent 280Z AA or 240Z AA with the internal UltrAA boosted lamp supply option, the software will automatically strike the lamp for you when you have enabled the UltrAA lamp option on the **Options** page of the **Methods** dialog.

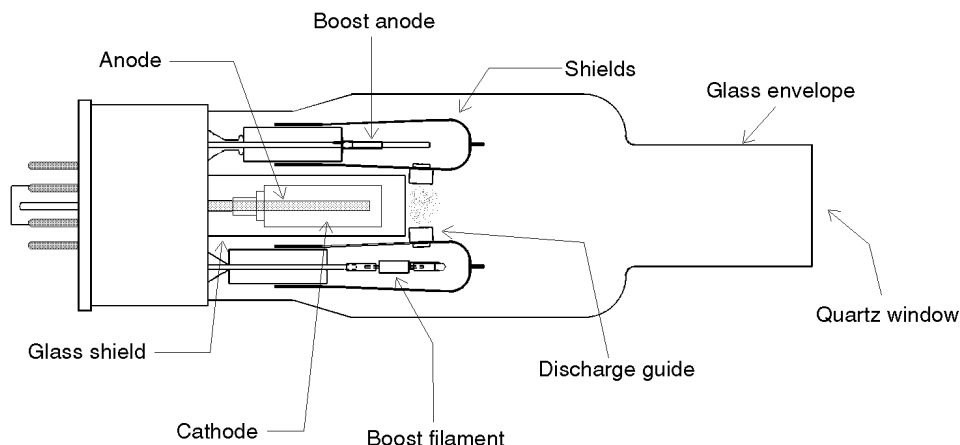


Figure 1 Diagram of an UltrAA lamp showing the boost discharge

Turning Off UltrAA Lamps

External UltrAA Boosted Lamp Supply

To turn off the boost discharge, push the lever of the appropriate switch to its 'off' position (i.e., \odot).

NOTE

You must turn the boost discharge off manually. The software turns off the normal lamp discharge automatically.

Internal UltrAA Boosted Lamp Supply

If you are using an Agilent 280Z AA or 240Z AA with the internal UltrAA boosted lamp supply option, the software will turn off all of the lamps at the end of an automated run.

Troubleshooting

Boost Does Not Strike

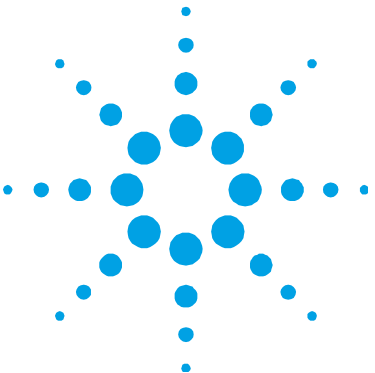
If the boost discharge does not start, check that the UltrAA lamp is fitted in the correct position. For four-lamp instruments, the UltrAA lamps may use positions 1, 2, 3, and 4. For eight-lamp instruments, only positions 1, 3, 5 and 7 may be used. Check the labels on the rear panel for external UltrAA lamp control module connection. If necessary, refit the lamp into the correct position.

If the lamp is in an appropriate position, try another UltrAA lamp in the same position. If the second UltrAA lamp works, you may need to replace the first lamp. If the second lamp does not work, you should check the fuses. If the fuses are intact, then you should contact your local Agilent field service engineer for further assistance.

“Lamp Not Recognized” Message Appears

Some older Varian labeled AA instruments do not recognize coded UltrAA lamps. You should check that the lamp position and lamp current specified in the message are correct and ignore the error message.

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6. Maintenance and Spare Parts

| | |
|----------|----|
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Cleaning

Always clean up any liquid spills immediately. The UltrAA boosted lamp supply should be cleaned daily with a soft cloth. If necessary, use a cloth dampened with water.

Fuses

Fuse Specifications

External UltrAA module

| | |
|-----------------------|--|
| 220–240 V | FS1, FS2: T3.15 AH 250 V, IEC60127-2 Sheet 5, 5x20 mm, Littelfuse 0215315* |
| 100–120 V | FS1, FS2: T4 AH 250 V, IEC60127-2 Sheet 5, 5x20 mm, Littelfuse 0215004* |
| Anodes | FS10: F1 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217001* |
| Strike Voltage | FS9: F0.315 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217315* |
| Filament 1 | FS4: F8 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217008* |
| Filament 2 | FS6: F8 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217008* |

Internal UltrAA Module (240Z/280Z AA only)

| | |
|---------------------------|--|
| All mains voltages | FS1, FS2: T3.15 AH 250 V, IEC60127-2 Sheet 5, 5x20 mm, Littelfuse 0215315* |
| Control | FS3, FS4: F0.8 AL 250V, IEC60127-2 Sheet 2, 5x20 mm Littelfuse 0217800* |
| Anodes | FS5: F1 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217001* |
| Strike Voltage | FS6: F0.315 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217315* |
| Filament 1 | FS7: F8 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217008* |
| Filament 2 | FS8: F8 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217008* |

*or equivalent

NOTE

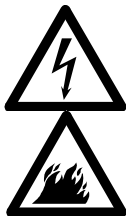
Fuse information on the rear of the equipment is the most up to date.

CAUTION

Any other internal fuse or circuit breaker is not operator-accessible and should be replaced only by an Agilent field service engineer.

Replacing a Fuse

WARNING



Electrical Shock – Fire Hazard

To prevent reduced safety protection or unwanted fusing, always ensure that the marking on the fuse matches the value screen-printed next to the fuseholder.

To check a fuse:

- 1 Disconnect the accessory from the mains power supply.
- 2 Undo the fuse cap by pressing the cap and turning it counter-clockwise.
- 3 Pull the cap out carefully; the fuse should be held in the fuseholder in the fuse cap.
- 4 Check that the fuse is the correct type and is not damaged. If necessary, replace the fuse in the holder.
- 5 Place the fuse into the cap, push the cap in, then turn the cap clockwise.
- 6 Reconnect the accessory to the mains power supply.

Always ensure both fuses are of the same type and rating before operation.

In This Book

The manual describes the following:

- Safety Practices and Hazards
- Introduction
- Specifications
- Getting Started
- Operation
- Maintenance

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